STUDIES OF AUSTRALIAN BEES.

THE RED BEES.

By TARLTON RAYMENT.

Permit me to tell you about the red-bodied bees, whose habitat extends from Queensland right down into Tasmania. I do not find them near the coast-line, but a few miles inland, especially among the hills they occur in abundance.

You must not be disappointed when many red bees in your collection are determined as *Parasphecodes*, and not *Binghamiella*; indeed, the former are very numerous, and for many years the latter were known by Frell Smith's name, *Sphecodes antipodes*, or else by the synonym of Sichel, *Santipus*. You see, these nomenclators overlooked a few features; consequently, when Bingham obtained a few specimens, he promptly pointed out to Professor Cockerell that these red bees had no affinity to the *Sphecodes*, nor did they show any relationship to the Australian *Parasphecodes*. Dr. Cockerell observed the short, wide tongue, that is possessed by all Prosopoid bees, placed them in the PROSOPIDIDÆ and created the genus Binghamiella. The Tasmanian form is known as the sub-species *B. antipodes insularis* Ckll.

But the likeness to *Parasphecodes* is very marked, and one may be pardoned for failure to distinguish the differences, for both have a black head and thorax, and are somewhat similar in stature. A lens will help you to discern certain prominences or nodules at the sides of the metathorax of *Binghamiella*, a character which is never observed on the *Parasphecodes*. The keen observer will see, too, the coarse, deep puncturing of the head and thorax. These points are sufficient, I think, to permit of your successful introduction to them.

To study the red bees one must capture a specimen or two. The nearest point to Melbourne where I have found them is at Box Hill, and about the hills of Ferntree Gully they are plentiful enough during February, March and April, though, to be quite truthful, I have never surprised one on a flower. I know not when or whence they emerge from their natal cradles, but males are about in February, and females are arriving right into the beginning of April. We can assume, then, that the mating time is during the early part of the year.

I seldom look about grasses for bees; they offer so little attraction to such inveterate lovers of honey and pollen, but an exception must be made of the *Binghamiella*, for grasses are the only plants on which I have collected them. I am not alone in this, for my friend, Clarence Borch, collected some males from the tips of the Kangaroo or Wallaby grass. Strange to say, all the specimens have been caught on cold, windy and rainy days, the male bees hanging miserably in groups of 30 or so, about the tips of the grass stalks. Both males and females have been observed in such inhospitable positions, though the latter are found singly.

Now, where are the nests? Frankly, I am writing this with the object of invoking the aid of all my fellow-members of the

Field Naturalists' Club during the coming summer. I have often found the nesting places of bees simply by reasoning from the anatomy of the creatures, and in this case I am going to outline where one should look, and why one should seek. In short, I shall write something that sometimes recoils on the author, yet I have often proved the value of the proceeding, and the risk is small. Oh, yes, I remember Fabre's warning, but I also recollect Darwin's prophecy regarding a moth.

The nest is a tube or gallery made originally by some other insect; the *Binghamiella* does not bore for itself. How do I know that? Well, the calcariae, or tibial spurs, of all earth-digging bees have one or more coarse teeth. The spines of this red bee are only finely serrated, like those of all other bees which nest in a second-hand home.

Because of the shape of the mandibles, or jaws, I venture to suggest that the tube will be found in wood, probably the abandoned gallery of a longicorn beetle. Had the jaw of the female been more acute, then I should have said "a shaft in the ground." At the bottom of the shaft there will be a cradle-lining of fine, silvery, skin-tissue, shaped somewhat like a "decapitated" hen's egg about 4 mm. in diameter and 8-9 mm. in length. Reason: The short, wide "tongue" of the "obtusiformes" (Westwood) denotes the weaving of fine coverings; the cells, therefore, are lined with tissue. The shape of the organ tells me that she is an industrious, and not a parasite, species, for all the latter have pointed tongues.

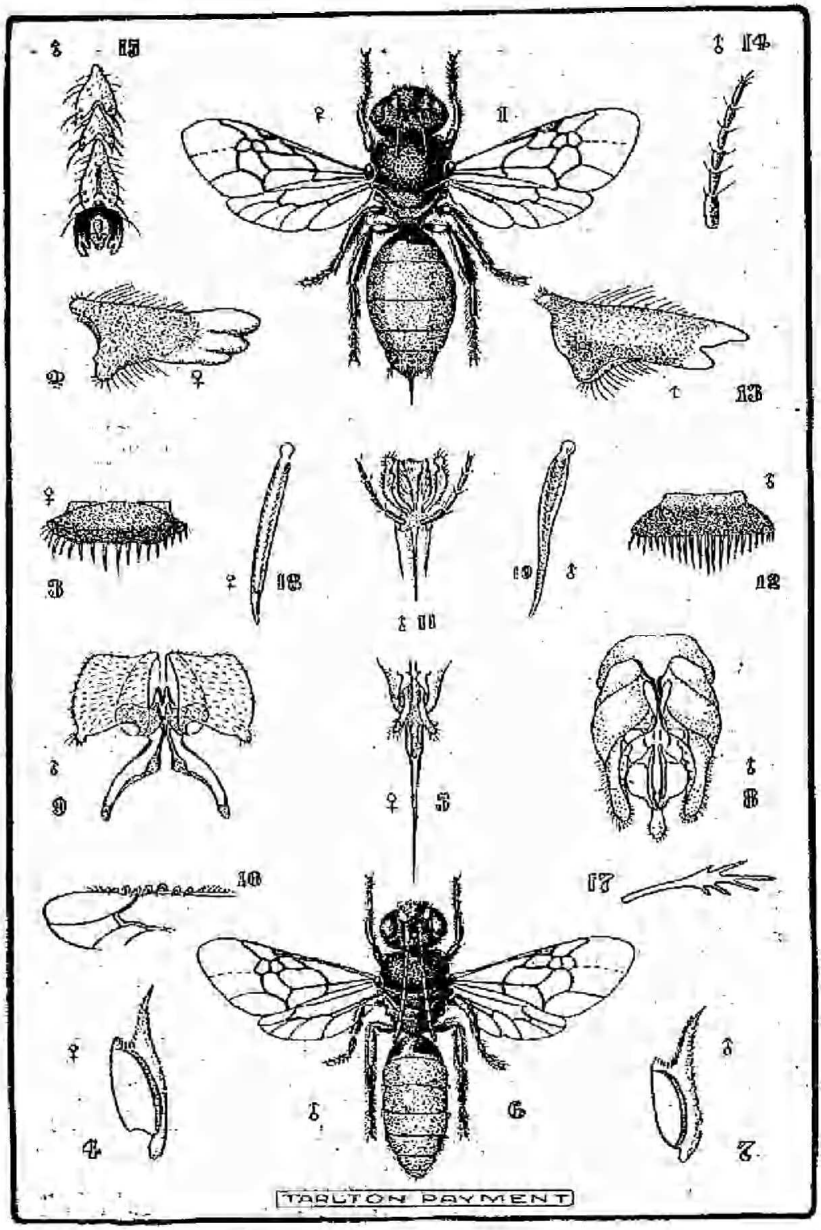
The nectar-sac, tongue, anterior legs and hairs of the creature assure me that pollen is swept up into the mouth with the fore-legs, and is swallowed and allowed to mix with the nectar; therefore the stores for the baby bees will be a thick batter placed in the bottom of the cell.

How many cells are in the tube? From two to six. Microscopical examination of the ovarian tubules reveals a limited capacity for egg production; no large family is possible.

The nest is not very far from where the bees are caught. I know this, because the hamuli, or wing-hooklets, are ill-formed and few in number. All the strong-flying bees have numerous, regular and beautifully-formed hamuli. It is plain to me that great or continued speed demands perfect co-ordination of the anterior and posterior wings; small, ill-shaped hooklets do not give efficient contact.

What is the order of the generations? Now I find myself stripped of all aid except what little I am able to deduce from the ovaries of the mother. Males and females emerge together in early summer; only one generation emerges each season; the couples mate during February; the fecundated females construct and provision the cradles and die off during late autumn; the baby bees are carried over the winter in larval form, and emerge during the succeeding late spring.

This is not pure conjecture; I have given a life-history built up solely from the anatomy of the creatures. I know I am not very wide of the truth, but I invite you to check my statements by your observations in the field.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TARLTON PAYMENT

KEY TO ILLUSTRATIONS, PAGE 242.

1. Adult female *B. antipodes* Smith.
2. Mandible of female.
3. Labrum of female.
4. Antenna-cleaner of female.
5. Sting extruded and showing small palpi.
6. Adult male, *B. antipodes* Smith.
7. Antenna-cleaner of male.
8. Genitalia.
9. Membrane that lies over genitalia.
10. Spur of male.
11. Glossa and labial palpi of male.
12. Labrum or lip of male.
13. Mandible of male.
14. Maxillary palpus of male.
15. Tarsal joints of leg.
16. The miserable wing hooklets or hamuli.
17. Forked hair from leg of female.
18. Hind spur of female.

EAGLES AND WALLABIES.

The Editor, the "Victorian Naturalist," Melbourne.

Dear Sir,—

In the June number of the "Naturalist," Mrs. V. H. Miller, writing of the Wedge-tailed Eagle, deplores that, in the bird section of the Perth Museum, a Wedge-tailed Eagle is suspended from the roof, holding in its talons a young Wallaby.

May I be permitted to state that the exhibit, illustrating the lifting power of the Eagle, is based upon personal observation! Some fifteen or sixteen years ago, whilst in the vicinity of the Calgardup Cave, Margaret River, in the extreme south-west of this State, I surprised an Eagle which had captured a Wallaby, *Macropus brachyurus*. On my approach the bird flew to a tree near by, but dropped its prey when I fired a 410 collecting gun. Investigation showed that the Wallaby was lying at the foot of the tree, apparently unharmed, and none the worse for its experience.

The museum taxidermist, Mr. O. H. Lipfert, found remains of another species of Wallaby, *Bettongia lesueuri*, in a Wedge-tailed Eagle's nest on Dorre Island, Shark Bay, whilst he was collecting there for the Museum in 1910. Both these species would weigh as much as a new-born lamb. During a visit to Milly-Milly Station, on the Murchison River, in 1922, I saw a number of Eagles' nests in low trees, and most of them were surrounded by a litter of bones, etc., amongst which were the remains of birds, rabbits and young Kangaroos, distinctly larger and heavier than the two Wallabies referred to above.

Yours faithfully,

L. GLAUERT,
Curator of the Museum.

Perth, December 12, 1928.